Entomological Society of Queensland

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Entomological Society of Queensland

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Front Cover: A photograph of the saltmarsh mosquito, *Aedes vigilax*. This species is found in coastal saltmarshes and mangroves from the south coast of New South Wales north around the continent and down to the southwest corner of Western Australia, and in the Riverland and Adelaide region of South Australia. Its drought-resistant eggs are laid in the margins of temporary pools that are flooded by peak tides or rain events. On subsequent inundation, these eggs can hatch simultaneously in millions, taking as little as 7-8 days to develop into adults. The adult mosquitoes are renowned for their capacity to disperse over many kilometres. This makes them the worst pest species in coastal Queensland, where the larvae are the target of aerial spraying programs by councils from the Gold Coast to Noosa. *Photo by Stephen Doggett, Department of Medical Entomology, NSW Health Pathology, Westmead Hospital. Used with permission.*

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Entomological Society of Queensland

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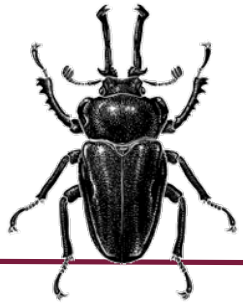
The **ENTOMOLOGICAL SOCIETY OF QUEENSLAND**, since its inception in 1923, has striven to promote the development of pure and applied entomological research in Australia, particularly in Queensland. The Society promotes liaison among entomologists through regular meetings and the distribution of a *News Bulletin* to members. Meetings are announced in the *News Bulletin*, and are normally held on the second Tuesday of each month (March to June, August to December). Visitors and members are welcome. Membership information can be obtained from the Honorary Secretary, or other office bearers of the Society. Membership is open to anyone interested in Entomology.
Contributions to the *News Bulletin* such as items of news, trip reports, announcements, etc, are welcome and should be sent to the News Bulletin Editor.
The Society publishes **THE AUSTRALIAN ENTOMOLOGIST**. This is a refereed, illustrated journal devoted to Entomology in the Australian region, including New Zealand, Papua New Guinea and the islands of the South Western Pacific. The journal is published in four parts annually.

EMBLEM: The Society's emblem, chosen in 1973 on the 50th anniversary of the Society, is the King Stag Beetle, *Phalacrognathus muelleri* (Macleay), Family Lucanidae (Coleoptera). Its magnificent purple and green colouration makes it one of the most attractive beetle species in Australia. Other common names include Rainbow, Golden and Magnificent Stag Beetle. It is restricted to the rainforests of northern Queensland. Emblem illustration by Sybil Curtis.



Entomological Society of Queensland
Minutes for General Meeting

Tuesday, November 13th, 2018
Held in the Seminar Rooms, Ecosciences Precinct, Boggo Rd, Dutton Park.
Meeting open: 1:02 pm

Attendance (34):

Members (22): Cate Paull, Penny Mills, Shannon Close, Mukund Madhav, Graham Forbes, Mike Barnett, Lyn Cook, Rachel Whitlock, Craig Edwards, Rebecca Nagy, Leanne Nelson, Don Sands, Gary Fitt, Alisha Steward, Bernie Franzmann, David Exton, Jessa Thurman, Des Foley, Greg Daglish, Tim Heard, Austin McLennan, Mike Muller

Visitors (12): Russell Hall, Dudley Horn, Ian Adermann-Horn-Trumba, Jess Morgan, Christine McCarthy, Cath Covacin, Rieks van Klinken, Adrian Holbeck, Paul Nielsen, Amalie Spadijer, Caitlin Johns, John Nielson

Minutes: The minutes of the last meeting were circulated in News Bulletin 46[7] October 2018. Moved the minutes be accepted as a true record: Cate Paull, Seconded: Tim Heard, Carried: All.

Nominations for membership approved by council:

Student Members:

Ashley Giles (*Kelvin Grove State College*)

General Business:

Mike mentioned the Moth Bombing Gympie and Bundaberg Project, with several activities occurring in late November and December in preparation for the 8-week Moth Migration Project Exhibition being held from April 26–June 22, 2019.

Main Business:

Presentation: "*Mosquitoes, moths and microscopes: life as a biosecurity entomologist in Australia"* presented by John Nielsen

Vote of thanks provided by Gary Fitt.

Next meeting: 11 December:
The next meeting will be our Notes and Exhibits Christmas Meeting! This meeting will start at 3 pm followed by our end of year gathering. Bring a plate to share and join us!

NOTE: change in start time: **3pm**

Meeting closed: 2:14 pm

A hover fly, *Episyrphus viridaureus* (Syrphidae), stops for a drink on a broccoli flower. The larvae of these flies are beneficial to have in the garden as they like to eat aphids.

At our next meeting...

Notes & Exhibits!!

The December meeting is one of our special *Notes & Exhibits* meeting. This is a less formal meeting consisting of several short talks and exhibits. Any member is welcome to share any item of entomological interest. It might be a 5 minute talk about an interesting observation, some items to show as an exhibit, a research update or plan - anything goes!

"Gonipterus in Queensland: documenting diversity and distribution". - Natalia Medeiros de Souza, PhD Candidate, University of the Sunshine Coast.

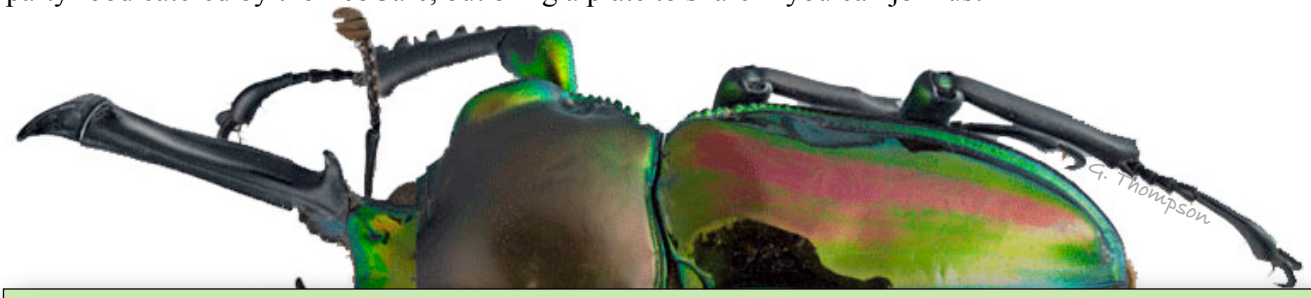
"Physicochemical Properties of Stingless Bee Honey from Queensland and Malaysia." - Nida Zawawi, Queensland Alliance for Agriculture and Food Innovation, University of Queensland.

"Pigeon Louse* Pseudolynchia canariensis *(Hippoboscidae) in Australia". - Christine Lambkin, Queensland Museum.

"Some history about the stag beetle,* Phalacrognathus muelleri*, our Society's insect emblem" - Geoff Monteith, Queensland Museum

"Bugs and Beads: the exhibition" - Vivian Sandoval, University of QLD/ Queensland Museum

This meeting is also our last meeting for the year, so plan to join us to celebrate with good food and good friends. **Please note: This meeting starts at 3 pm**. followed by our end of year gathering. We'll have some party food catered by the EcoCafe, but bring a plate to share if you can join us!



Tuesday 12 December at 3pm

Ground floor Seminar Room at EcoSciences. Tea, coffee & party food following.

All welcome!

Mosquitoes, moths and microscopes: life as a biosecurity entomologist in Australia

presented by John Nielsen
Australian Government
Department of Agriculture and Water Resources
Canberra ACT

Hi! I'm John Nielsen, and I work as an entomologist with the Australian Government Department of Agriculture & Water Resources. My interest in entomology started as a nine year old when I began collecting butterflies, which then saw me complete a Bachelor of Science with Honours in entomology at the University of Queensland between 2001-2004. Soon after completing Honours, I unexpectedly found myself being offered a three-month contract with the Department of Agriculture & Water Resources (then Department of Agriculture, Fisheries and Forestry) in Sydney. My career with the department is a privilege that has allowed me to work with an incredible diversity of insects from around the world, and given near daily opportunities to make a difference to Australia's biosecurity. There is no other career quite like it!

So, what is a biosecurity entomologist and what do we do?

Biosecurity entomologists work on exotic insects that could affect human, plant and animal health, and the environment, if they became established in a different part of the world. Australia's geographic isolation makes it particularly vulnerable to the impacts of exotic insects, especially given many of our agricultural industries also rely on exotic plants and animals that have few (if any) native pests and diseases. Working in the Department of Agriculture and Water Resources offers entomologists an incredible diversity of work, including as diagnosticians, trade and market access specialists, supporting roles for government committees managing incursions of exotic species as surveillance coordinators. I have had the privilege of working across all these roles, and will draw on my experiences to flesh them out here.

For entomology students!

One of the main reasons I agreed to give a talk at the ESQ was because, as a student, I appreciated the guidance and support from a number of entomologists well established in their careers. My talk–and subsequently this article–is largely aimed at students to make them aware of the career opportunities that exist within the field of biosecurity, as it is often overlooked in favour of pursuing a PhD or a role in academia. Given many entomologists will be retiring in the next few decades, there is a strong likelihood that students with entomological experience will be in high demand in years to come. As international trade–and the diversity of species associated with trade–continues to grow, demand for biosecurity entomologists is likely to be very high. Additionally, the opportunities available to biosecurity entomologists are incredibly diverse and often exciting, which makes working in this role extremely fulfilling (or at least it has been in my experience).

Starting out with the department – diagnostician, Operational Science Program, Sydney (2005-2007). My first role in the department was working as a diagnostician with the department's Operational Science Program (now Operational Science Services) in Sydney. Biosecurity diagnosticians are responsible for identifying the impressive diversity of insects and other arthropods, as well as molluscs and sometimes even vertebrates, intercepted from global trade pathways into Australia. Diagnosticians are generally very busy: in 2017, the 30-odd diagnosticians working from the department identified over 170,000 different taxa, noting that each "identification" can consist of between one to 100 or more individuals, each of which need to be identified as accurately as possible. A significant number of these related to pest species that would have had serious or even catastrophic impacts on agriculture, society and the environment.

It is important to recognise the importance of diagnosticians to biosecurity, as they are responsible for establishing the identity of intercepted specimens. Identity is critical to biosecurity; in fact, taxonomy and nomenclature underpins biosecurity. Getting the identity of an interception wrong can result in a variety of very bad outcomes. At worst, it can result in a species entering and establishing in Australia because it was either misidentified as a species present in Australia, or because an ineffective treatment was prescribed. An example of this is Mexican Needle Grass (*Nassella tenuissima*) entered and became established in Australia because it was imported as seeds under a synonym that failed to be flagged with the import conditions database as a prohibited species. Treatments that may work for one species–or even different life history stages of the same species–may fail to work for others. At the other end of the spectrum, misidentifying a species that is not of biosecurity concern as a pest and requiring biosecurity treatments can create diplomatic issues that can take some time to resolve and have a far-reaching effect on other Australian interests.

The department routinely identifies in excess of 300 insect families yearly from almost all orders. This requires sound skills in insect morphology and use of often complex taxonomic keys and reference to preserved specimens. The department is a major user of insect collections Australia wide, and maintains large collections specialising in invasive species, as well as having entomologists based in the Australian National Insect Collection (ANIC). A typical day in the life of a biosecurity diagnostician would see them seamlessly swap between identifications involving very different families and orders within a few seconds. IDs range from the usual suspects–thrips, stored product pests, foliage feeders and timber borers–to new and emerging pests that can be very challenging to identify. To ensure IDs are accurate, the department uses a variety of quality assurance measures (including yearly verification of identification skills). Once an identification has been made, the inspectorate are advised of the result so that biosecurity treatments appropriate to the risk scenario can be arranged to remove risk as soon as possible.

Collections underpin much of the department's diagnostic capacity. I made extensive use of collections throughout Australia as a diagnostician, and had the privilege of working with the Smithsonian/Walter Reed Biosystematics Unit mosquito collection in Washington, DC in June 2018.

I often get asked about some of the more memorable identifications or incidents I dealt with as a diagnostician. Here are a few favourite "war stories" from this period:

When I started working for the department, I did not have my driver's license and was encouraged to obtain one as soon as possible. About an hour before my last driving lesson (and I needed that last lesson to be eligible to sit my P-plate exam and in turn be eligible for my contract position!), I was handed a vial containing six dermestid beetle exuviae. Running them through the stored product key revealed I was in nightmare territory; they closely resembled *Trogoderma granarium*, aka khapra beetle. Its presence in Australia would result in loss of market access to key export grain markets. Intercepting one of these is an adrenaline rush at the best of times, but just before my last hour of driving lessons needed to keep my job only added to the pressure! The next 30 minutes saw me dissect the epipharynx out of all six larvae (noting they are less than 10 mm long). The characters to identify some of the *Trogoderma* include the number of nodules present in a sclerotised ring on the epipharynx (i.e. the roof of the beetle's mouth!) Once dissected, I needed to slide mount the epipharynx and dissected head capsule of each beetle to be able to look at them at high magnification to confirm the ID. Somehow, I managed to dissect everything, confirm the ID with my supervisor, and make arrangements to fumigate the consignment and still make the driving lesson in time! It was a very good feeling to then ace my driving test the following day.

Perhaps the most bizarre ID I ever participated in did not even involve an insect. Answering my phone one day, I was asked if I could help with an unusual ID, noting that it had the potential to be emotionally challenging. Curiosity piqued, I agreed, and was soon presented with a specimen for preservation: one small dog (*Canis familiaris*), whole, dried, for human consumption! It had apparently been detected by one of the biosecurity beagles and swiftly seized (the passenger had at least declared they were carrying food for human consumption). The specimen is still retained by the department.

The Department of Agriculture and Water Resources operates a large mosquito monitoring mission, with some 70 staff collecting mosquitoes from 800 egg, larval and adult traps at over 80 international airports and seaports Australia wide. As National Vector Coordinator, I regularly visit officers nationally to check local arrangements, including at Townsville (left) and Cairns (right) earlier this year.

Noting Lepidoptera are one of my major groups of interest, I was soon introduced to a species complex that would define my career for the best part of a decade: Asian Gypsy Moths (AGM; *Lymantria* subgenus *Porthetria*, especially *Lymantria dispar* and its subspecies). These moths are strongly attracted to lights at night and settle out on anything illuminated. For populations close to seaports, this can include a range of sea cargo, and even the vessels themselves. Hatching larvae can balloon for some kilometres under ideal conditions, and will feed on several thousand plant species. In 2006, a vessel arrived at Newcastle, having declared an infestation of AGM egg masses *en route*, and was immediately boarded by my then manager (Ross Rickard) and the

Newcastle inspectorate to inspect the vessel. The inspection resulted in a very large number of egg masses recovered from the superstructure. As the day drew to a close, the holds were then opened for inspection and found to contain hundreds more egg masses! The vessel was ordered out to sea immediately while arrangements were made to have it berth at a port where cherry pickers could be lowered into the holds. I subsequently found myself at Port Kembla south of Sydney the following Saturday as a supervising entomologist for the hold inspections. After a number of very long, hot and exhausting days, our grand total for the entire vessel was over 500 egg masses. While I enjoyed the experience, I was struck by the difficulty of finding a 50-cent sized egg mass on the labyrinthine superstructure, and impressed by the diligence and determination of the inspectorate in searching out these egg masses. Learning they had spent much of that week searching a number of other vessels for eggs and finding nothing, I started thinking about whether we could do anything to better target vessels. The ideas I came up with on that day while doggedly hunting egg masses would change my career some five years later.

Occasionally, entomologists are asked to contribute to something that can only be described as a job after your own heart. One of these jobs involved a request from the department's PR section to help design giant, animatronic insects for a PR campaign: a giant Khapra beetle and a giant longicorn (Cerambycidae) beetle larva. This involved a number of visits to an incredible special effects company not far from our Sydney office to help design and produce the insects. I thoroughly enjoyed the experience; even taking photos of some intercepted specimens to help inform the design of the cerambycid (Count Dracula mandibles were narrowly avoided!) and providing detailed instructions on the paint scheme for the khapra beetle. The final result was remarkable and extremely accurate; the only mistake was the terminalia of the beetle were mounted upside down! When I was passed the finished khapra beetle to

How often do you get asked to help design a giant, animatronic khapra beetle (*Trogoderma granarium*)? And how could you say no!

hold, it was hard to not look at it with great love given how much enjoyment I had in helping design it; only to be asked if I would look upon my first born child with as much love!

In addition to my ID responsibilities for general biosecurity interceptions, I also found myself the Regional Vector Coordinator for the department's mosquito vector monitoring program in NSW. Despite having had very limited knowledge of mosquitoes previously, I thoroughly enjoyed learning how to identify the diversity of mosquitoes in NSW (and key exotic species), to the point of coming in at 5 AM just to work on mosquitoes! My enthusiasm for mosquito IDs even led to an invitation for me to teach larval identifications at a departmental vector monitoring workshop. I sorely missed working on mosquitoes when I moved to a policy position in 2007–perhaps more so than the general insect IDs–which was a massive motivator to apply for the National Vector Coordinator role when it became open nearly a decade later.

I worked as a diagnostician with Operational Science for about two and a half years. During this time, I completed just over 7300 identifications and

2100 incidents. In addition, I identified at least 15,000 mosquito specimens over the same period, provided numerous training courses to both new-starters and experienced inspectors, and was even interviewed as a biosecurity entomologist on Radio National and the joint Channel 10/CSIRO TV program *Scope*. I also met my now wife, which led to me moving to Canberra to take a policy position in the trade and market access environment of the then Biosecurity Australia's Plant Division.

Trade and Market Access policy: Biosecurity Australia/Plant Division, Canberra (2007–2016).

Plant Biosecurity is a policy-based division in Canberra that is responsible for opening and maintaining market access opportunities that are critical to Australian producers, and determining measures for imported goods. These processes are regulated, in that there is a standardised approach to risk assessment, with the policy documents (called Biosecurity Import Risk Assessments or BIRAs) following the same format and assessment process. Literature reviews are conducted to determine what species are likely to be present on an import or export trade pathway, and exotic species identified. The probabilities of entry, establishment and spread are then investigated for all exotic species, as well as the potential for consequences should they become established in Australia. Species whose probabilities of entry, establishment and spread, and consequence analysis, are above Australia's Appropriate Level of Protection and are then subject to measures to remove them from the pathway.

Receiving the ComCover award for excellence in Government risk management in 2012 with (left to right) ex-NSW DPI plant pathologist David Letham, ex-CSIRO stored grain entomologist David Rees, DAWR senior policy officer Samantha Styles, DAWR Branch Head Bill Magee and DAWR Assistant Director Tom Watson.

I contributed to numerous BIRA documents both as a risk assessor and, later, as a member of the scientific review team. The amount of work that goes into each BIRA should not be underestimated: each contains at least a PhD's worth of literature review, written to tight deadlines. Writing policy for BIRAs requires excellent understanding of taxonomy and nomenclature, as well as sound research skills (including searching literature in other languages). Biological identity is again critical to BIRA policies, and I became very familiar with the International Code of Zoological Nomenclature through this work. My expertise with the Lepidoptera was put to very good use in this role; I found myself working on numerous pest species from around the world, including an old nemesis from my time as a diagnostician.

About a year after I started with Plant Biosecurity, I was asked to contribute to policy on how to better target AGM on maritime vessel pathways. I immediately proposed the idea I had while looking for egg masses on the vessel in Port Kembla in 2006. It was something that had not been done anywhere else in the world: using geospatial intelligence to predict which seaports posed greatest AGM risk. The approach was relatively straightforward: a paper by USDA colleague Sandy Liebhold found that AGM in Japan settled out around lights within 1800 metres of entering a city. While AGM can fly much further, the ability of lighting to reduce their practical flight range is what matters. Any port within 2000 metres of a forest patch of 1 hectare or more was considered to present a risk of AGM being able to contaminate vessels. Maps were then produced using commercial forest cover data collected by satellite (each forest type reflects a slightly different wavelength into space, allowing even small patches of forest to be

accurately identified), which were then overlaid onto Google Earth and a 2000 metre radius added to each vessel berth to identify the risk ports. While I did most of the geospatial work on this project, I was strongly supported by ex-CSIRO entomologist David Rees and ex-NSW DPI plant pathologist David Letham; working with them was a career highlight. Once the maps were produced, I designed a trial program for the inspectorate that targeted vessels from across Asia that had visited one of the risk ports and was transiting directly to Australia. The results were remarkable: the department detected more egg masses in the space of a few months than it had in the past few years. This project was subsequently nominated for and won second place in the 2011 ComCover awards for excellence in risk management.

In Argentina collecting egg masses (right) of the saturniid moth *Hylesia nigricans* on *Salix* spp.; June 2011.

While this was a great result, I still wondered if we could do better again in targeting inspections to the vessels presenting highest risk. Looking into why AGM had not established in Australia despite such a high arrival rate, I found an answer in the literature. AGM eggs must complete cold diapause before they can hatch, with the most optimum temperature/duration being an average of 5°C for 90 days. A review of interception records confirmed that there had been just one detection of live larvae on a vessel in nearly 40 years, and an experiment by Bill Crowe in the Brisbane quarantine insectary using freshly laid eggs collected from vessels confirmed they were unable to hatch on newly contaminated vessels. A chance meeting with CSIRO modeller Dean Paini at an invasive species conference in China later established a project under the CRC for Plant Biosecurity to develop a model predicting egg hatch potential for vessels. The model uses vessel travel history for the previous 12 months to predict the temperature regimes any egg masses on board would experience, and identified vessels likely to produce hatching eggs on arrival in Australia. Work on this project is drawing to a close, with the model due to be integrated into the department's maritime vessel risk assessment database. Other work I completed with AGM included helping the Defence Science and Technology Organisation design and run a national security discussion exercise involving AGM spreading via transport systems!

David Rees and I also worked with another potentially invasive moth, this time a saturniid called *Hylesia nigricans*. A member of the exotic subfamily Hemileucinae, *H. nigricans* is a pest of numerous fruit and street trees in its native Argentina, but is also a serious threat to human health. The abdomen of the adult females is covered in urticating scales, which can cause severe skin irritation and a painful rash. Eggs and some very badly damaged adults of these moths arrived in mid-2011 on a shipment of new cars from Argentina. David used a very unique approach to identify the moths, which were initially thought to be AGM based on the egg masses (the adults were badly damaged and proving difficult to key out). He googled *plagos mariposa Argentina* (pest moth Argentina) and found an image of the female moth within seconds! As a result, we soon found ourselves on our way to Argentina with my former supervisor from NSW Operational Science, Ross Rickard. The cause of the contamination was deceptively simple: a seaport had been built in the middle of a forest of the moth's native *Salix*

hostplants on the Rio de la Plata about 100 km north of Buenos Aires. We also found that the port was being illuminated by mercury vapour and metal halide lamps; the port was in essence a giant light trap! After impressing our Argentinean colleagues by walking up to a tree I had identified on Google Earth from Canberra and finding an egg mass within seconds, we delivered our recommendation: change the light bulbs in the port to sodium vapour. This would reduce the amount of UV light emitted and hence reduce the attractiveness of the port to the moth. It worked! The moth has not been seen on shipments of cars from the port since. The answer to how many entomologists do you need to change the light bulbs in a port is therefore three!

To be successful in working with exotic insects, the department maintains links with entomological researchers around the world. I have travelled to Taiwan, Argentina, the United States, Canada and China working with plant biosecurity, both as a visiting scientist and as an entomological specialist supporting trade negotiations. Visiting Canada and the United States in 2012 allowed me to gain good exposure to forestry practices in British Columbia, which saw me develop more of a niche role as a forest entomologist towards the end of my time with Plant Biosecurity. During that visit, I saw firsthand the damage caused by Mountain Pine Beetles during the 1980s, and including the rise of a potential new pest: a tortricid called spruce budworm (*Choristoneura* spp.). These moths attack the fresh buds of various *Pinus*, preventing the plant from growing that year. Damaged trees take on a burnt appearance, and this can cause trees to die if they are affected over multiple years. The outbreak in British Columbia in 2012 produced so many moths that they could be heard in flight around light sources in towns bordering the forest. I also saw the pre-export pathway for Douglas Fir timber to Australia, which allowed me to support trade negotiations with Canada a few years later.

Developing an interest in forestry entomology also saw me nominated to support risk assessment discussions for a margarodid scale insect called the Giant Pine Scale (*Marchalina hellenica*), which was detected in Australia in 2015. My work on the scientific advisory panel gave me an exposure to the section of the department that manages incursions and resulted in my next role with the department.

Secretariat support to the Consultative Committee for Exotic Plant Pests (CCEPP): 2016

Unfortunately, exotic pests can and do arrive in Australia despite the massive resources–and dedication of entomologists and the inspectorate alike–expended to prevent them. When this happens, an intergovernmental and multi-industry agreement called the Emergency Plant Pest Response Deed (EPPRD) is used to respond. The EPPRD sets out a series of processes: including reporting timeframes from time of detection, pest categorisation, risk assessment, cost sharing, eradication activities and stand-down activities that provide a rigorous and transparent process. In addition to being signatory to the EPPRD, the department also provides secretariat support to the committee that carries out the EPPRD processes: the Consultative Committee for Emergency Plant Pests (CCEPP). Intrigued by helping with the EPPRD processes–and working with the CCEPP secretariat on Giant Pine Scale–I took a six-month secondment to the CCEPP to learn more.

Secretariat work requires a lot of organisation; instead of being an entomologist, I found myself organising CCEPP meetings, preparing and distributing meeting agendas and taking minutes. This may seem like very bland work for a scientist, but I thoroughly enjoyed learning these skills (noting I was being taught by a very skilled plant pathologist, Cheryl Grgurinovic, who was team manager). The EPPRD is a complex document, but is something all entomologists should have even a basic understanding of in case they find an exotic species in Australia. Rather than try to summarise it here, Plant Health Australia's website provides an excellent introduction to the EPPRD and has a series of free training courses on their website. Anyone working with insects in Australia (including

amateurs/collectors!) should consider taking the time to complete at least some of these courses to understand how they can support management of exotic plant pest incursions in Australia.

As my secondment was coming to an end, I found myself supporting the Tramp Ant Consultative Committee in Brisbane, and had a chance encounter with the department's senior entomologist, Bill Crowe. Was I interested in working with mosquitoes again as National Vector Coordinator?

Mosquito vector monitoring: 2016-present.

Vector monitoring is not technically surveillance, or a biosecurity measure: it is a special provision of the World Health Organisation's International Health Regulations to manage vectors of human disease at all ports. In practice, Australia's vector monitoring program does have a strong focus on exotic mosquito vectors, especially *Aedes albopictus* and (regionally) *Ae. aegypti.* The program is the department's largest entomological program, with over 70 staff operating close to 600 mosquito traps at the 80-odd first points of entry Australia wide. We also look at as many (if not more) specimens than Operational Science; a quiet *El niño* year will see the program perform over 300,000 identifications, with this number increasing to about half a million during a *la niña*. The program maintains very close links with state and territory government medical entomologists Australia wide, as well as with port operators. As coordinator, I am kept busy analysing the data collected by the program, ensuring activities are consistent nationally and providing governance support to detections. I also visit as many ports as possible each year to make sure I am familiar with the key risks for each and to make sure the program officers are being supported adequately.

While exotic mosquitoes are a perennial risk, even subtle changes to a trade pathway can change it from hostile to favourable to mosquitoes. In 2014, there was an abrupt spike in detections of *Ae. aegypti* at international airports Australia-wide, with detections continuing well into 2016. The teamwork of the department, state and territory and local governments nationally was responsible for the successful management of all these detections. Molecular data showed that the majority of these detections were associated with Denpasar, Indonesia. While the aircraft pathways fell in 2017 and continue to fall in 2018, the unusual wet weather in Japan during 2018 appears to have been responsible for a spike in detections of mosquitoes (especially *Ae. japonicus*) associated with oversized tyres. New measures for oversized tyres were introduced in

In British Columbia, Canada, auditing the Douglas Fir timber pathway from Canada to Australia. As the majority of timber in easy to harvest areas has been removed, Sikorsky Skycrane helicopters are used to reach timber in inaccessible sites (left, centre) and lift the logs out to roads, where they are then trucked to a suitable port and towed by tug boats to sorting yards for grading. They are then milled and sent to Australia if they pass rigorous quality control inspections that remove infested timber from the pathway.

Mosquitoes are too often thought of as bloodthirsty pests, but they can be remarkable for their ecology or even beauty. Left to right: pitcher plant mosquitos (*Wyeomyia smithii*) breed only in the traps of northern pitcher plants (*Sarracenia purpurea* L.); the impressive South American bamboo breeding *Sabethes cyaneus*; and a species of *Haemagogus* from Latin America that can use tyres as breeding sites.

October 2018, and the pathway is under heightened surveillance to verify their efficacy at the moment.

In June 2018, I was honoured to be hosted by the United States Army, spending three weeks at the Walter Reed Institute of Army Research (WRAIR). The US Army may seem like an odd choice for teachers, but they have a very comparable mission to the department's vector program: we are both primarily focused on personnel protection, target the same species (which means we also require similar traps and face the same diagnostic challenges), operate in harsh conditions (ports and warzones are very harsh environments for mosquitoes) and have to make decisions quickly and under challenging conditions. WRAIR has formidable capabilities: their insectaries rear well over one million mosquitoes at any one time and must produce them on order to support world-leading research on mosquito, arbovirus and malaria management. The United States is also home to a number of mosquito trap manufacturers, and working with the Army allowed me to use and evaluate a number of traps not yet available or used in Australia. WRAIR also receives diagnostic support from the collections at the Smithsonian Institution, with the mosquito collections incorporated into the Walter Reed Biosystematics Unit (WRBU). Being able to see, handle and identify specimens of key exotic vectors was a special privilege, as was being able to see the incredible diagnostic capacity held by the WRBU. Working with the US Army entomologists was an experience that will not be easily forgotten, and the many opportunities made possible from the experience will shape vector monitoring for years to come.

To close, I have to mention my introduction to mosquitoes: a surprisingly predictive third year entomology assignment developed by Margaret Schneider and Greg Daniels at UQ. For this assignment, I was given a specimen and this scenario to respond to: *You are a quarantine entomologist, and a member of the public has sent you this mosquito to identify. They are concerned it will give them dengue or malaria. What is it, and what disease risk does it pose*?

I remember my first reaction was "quarantine entomologist? Like that will ever happen". Given Greg's trademark taciturn humour, I was immediately suspicious that the specimen would not be a mosquito. However, the *Insects of Australia* and *The Culicidae of the Australasian region* assured me that it was not only a mosquito, but *Toxorhynchites speciosus,* a large nectivorous species with larvae predatory on other mosquitoes that posed no disease risk. Being thorough, I wanted to see a specimen to be 100% sure and visited Greg in the UQIC to use the Marks' collection and verify my ID. After convincing Greg that I *had* keyed the specimen out and wasn't going to eyeball each drawer until I found the right species, I was allowed a supervised visit to the *Toxorhynchites* drawer. I was also told by Greg that it was lucky for me he was GOD: his full name being Gregory Oliver Daniels (G.O.D.) after

Examining insectary procedures at the Walter Reed Institute of Army Research in Washington, DC, in June 2018. Note the mosquitoes in the container I'm holding had not been blood fed, and have formed the silhouette of my hand in an attempt to take a blood meal through the container.

all. When I duly thanked "Mr G.O. Daniels for access to the Marks' collection" in my presentation, Margaret and Greg literally fell out of their chairs laughing: Greg doesn't actually have a middle name! I have lost count of the number of times I have faced the *Toxorhynchites* scenario as a biosecurity entomologist, but the memory of Greg's prank makes me smile every time it happens.

Acknowledgements

I owe a lot to many people who took the time and consideration to help me as a student and during my work as an entomologist, and would like to thank them here. Brian and Spencer Clarke and Les Ring were responsible for establishing my interest in entomology, and Bert Orr and Rod Eastwood have been wonderful mentors. The amateur Lepidoptera community (Bob Miller and family, Russell Stoodey, Graham Forbes, Ted Fenner, Cory Dale and John Moss) made a massive difference by supporting my enthusiasm as a student, with Ross Kendall and family in particular going above and beyond in their support. Fabian Douglas, John Grehan, Allen Sundholm and Nick Temby continue to encourage my extracurricular interests in these "other" insects with scaled wings and a proboscis. Special thanks are due to Margaret Schneider and Greg ~~Oliver~~ Daniels for giving me the best start possible with their training in insect taxonomy and diagnostics at UQ. Ecological modelling theory taught by Gimme Walter and Myron Zalucki gave me the skills to be able to make a difference with Asian Gypsy Moths. Geoff Waite, Russell Parker and Dan Smith of the old Queensland DPI provided excellent hands on training while I was a work experience student. Murdoch de Baar and Dick Drew taught me invaluable skills in identifying timber borers and Dacinae fruit flies, respectively, which helped immensely during my time with Plant Biosecurity. I owe a special debt to Fred MacDonald for suggesting me as a candidate to the Department of Agriculture & Water Resources in the first place, and to Ross Rickard and Luke Halling for employing me. In Agriculture, I could not have asked for better managers that I have had in David Letham, Ray Elson, Cheryl Grgurinovic and Caroline Martin. Working with David Rees was a joy and time spent in his company was among the best of my career. Angus Sly, Stephen Doggett, Cameron Webb, Cassie Jansen, Jon Dabro, Brian Montgomery, Nina Kurucz, Martin Shivas and Darren Alsemgeest have all be amazing to work with in vector entomology. I cannot thank COL Mark Carder, MAJ Lee Mcphatter and MAJ Jorge Lopez enough for facilitating my training with the US Army earlier this year, and to Joe Davis for putting us in touch. Last but by no means least, special thanks are due to current ESQ president Mike Muller for his invitation to talk at the ESQ, and for his ongoing encouragement of my passion for vector entomology.

Australians in Vancouver

The conference logo was inspired by a legend from the indigenous Tsimshian people about the origin of the mosquito.

Vancouver, Canada hosted the Joint 2018 Entomological Society of America, Entomological Society of Canada and the Entomological Society of British Columbia Conference on the 11-14 November. Over 3000 people attended the conference which took place in the beautiful, multi-level Vancouver Convention centre. Attendees came from all over the world, including Australia! At least 30 Australians attended and participated by giving seminars, running symposia and displaying posters.

ESQ member, Raj Jagadeesan received the prestigious Henry & Silvia Richardson Research Award for Early Career Professionals. Raj works with the Postharvest Grain Protection Team at Queensland Department of Agriculture and Fisheries (QDAF). The award he received is given to a postdoctoral scholar who has shown promising work in insect control research and has demonstrated a high level of scholarship. Well done, Raj!!

Another ESQ member, Nicole Gunter (currently at the Cleveland Museum of Natural History) also received an award (although slightly less prestigious), for the most creative talk at the SOLA Scarab Workers meeting for her talk entitled: "*Who's poos do Ohio's dung beetles choose: a study on food*

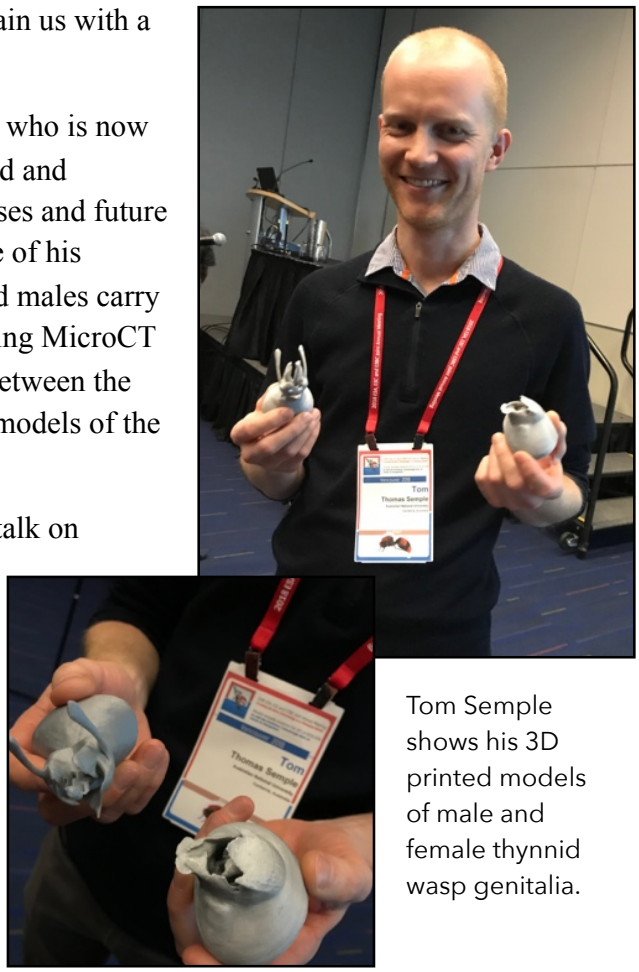
Vancouver Convention Centre is situated on the shores of the Burrard Inlet in central Vancouver.

The grand ballroom ready for the plenary speaker, Randy Olsen, who gave us advice on scientific communication: the narrative is everything!

View of Burrard Inlet from the convention center. Seaplanes take off regularly to ferry people to the nearby islands.

preference". Nicole managed to skillfully inform and entertain us with a presentation of her research totally in rhyme!

ESQ member and 2015 Student Award winner, Tom Semple, who is now finishing his PhD at Australian National University, organised and moderated a section symposium on "Insects in 3D: current uses and future directions for high resolution 3D data". Tom presented some of his amazing 3D images of thynnid wasps *in copula*. The thynnid males carry the females around *in copula* while they feed on flowers. Using MicroCT imaging, Tom is able to study the mechanics of attachment between the male and the female. Using 3D printing, he is able to make models of the structures for visual aids.



Tom Semple shows his 3D printed models of male and female thynnid wasp genitalia.

ESQ member and UQ Professor Myron Zalucki presented a talk on processionary caterpillars and equine abortions. He also helped coordinate a special symposium on monarch butterflies in honour of the late Lincoln Brower, who is noted for his extensive research on monarch butterflies through six decades.

Although I admit I am slightly biased, my favourite talk from the meeting was by Ainsley Seago, from the New South Wales Department of Primary Industries. Ainsley entertained and educated the Coleopterists Society meeting with her seminar on the weird and wonderful habits of beetle inquilines!

--Kathy Ebert

News from the North

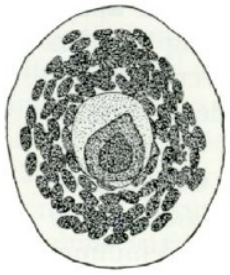
Egbert Friedrich, Dave Rentz and Buck Richardson priming themselves for a night of mothing at Wright's Lookout, Kuranda. Photo: P. Peuker.

Lost contact lens? No. Losing their marbles? Quite likely. But in reality they are examining an overlooked habitat at the Daintree Rainforest Observatory, Daintree, Qld. At least 6 cricket species, a number of beetles and several bugs live and thrive in this mowed grass (shh, golf course) adjacent to rainforest. Many of the species cannot be found elsewhere at the locality. Photo: B. Richardson.

‘Much ado about scales!’

Aspidiotus nerii. Image credit CSIRO science images.

Mealybugs. Image credit CSIRO science images.

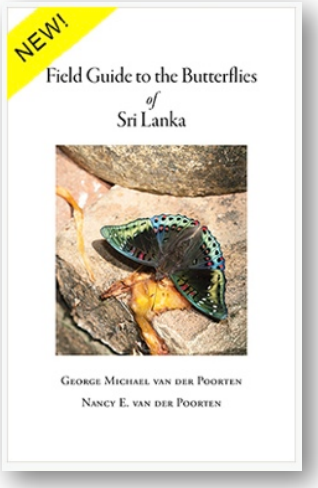


Aspidiotus destructor. Image credit CSIRO science images.

The University of Queensland played host to a scale insect identification workshop during the week 12-16th November. The workshop was organised as part of the National Plant Biosecurity Diagnostic Network. Michael Gorton and Cath Harvey (both of the Federal Department of Agriculture and Water Resources) led the workshop, which was attended by some 15 participants from Australia and New Zealand, including Mark Schutze (Qld-DAF/ESQ Secretary). Some of the ‘minor’ groups were covered, but the main focus was on the ‘major’ groups of pest importance, including the soft scales (Coccidae), armoured scales (Diaspididae), and mealybugs (Pseudococcidae). A most productive and enjoyable week was had by all, especially the workshop dinner at South Bank!

People in photo (L-R): Lauren Drysdale, Nicole Cliff, Andy Szito, Peter Gillespie, Glenn Bellis, Stacey Lamont, Santha France, Carl Wardhaugh, Annie Van Blommestein, Helen Brodie, Michael Gorton, Mark Schutze, Roberta Hitchcock, Lixin Eow. Photo credit: Nicole Cliff

NEW! Field Guide to the Butterflies of Sri Lanka



Regular AUD$39*
until Jan 31, 2019, special offer of AUD$32*
[*plus AUD$9 postage and shipping]

Michael Braby sends us news of a new book by George and Nancy van der Poorten. The van der Poorten’s have written a Field Guide to the Butterflies of Sri Lanka. It is a compact and easy to carry field guide: a softcover paperback; 250 pages; measuring 4-3/4” x 7-1/2”. They have a special price offer until the end of January. You can place your order by emailing the authors at lepodonbooks@gmail.com. Check out their website www.lepodonbooks.com for more information.

ISBN: 978-1-77136-605-2. Published September 2018.

Submissions now open for: ESQ Student Award & Small Grant Scheme

ESQ Student Award ($500):

The ESQ Student Award was established to encourage entomological research.

- Each year the Society offers a $500 award to a student who has finished an Honours or 4-year degree at a Queensland tertiary institution.
- Students need not be members to apply.
- Students must submit their Honours thesis or report on an entomology related topic
- Closing date for submissions is early April (exact date TBA).
- Student award winners will be announced at our May meeting, then will present a brief overview of their research at the June Notes & Exhibits meeting.
- Submission form is available on the Society website at: www.esq.org.au/pdf/studentaward2019.pdf

ESQ Small Grants Scheme:

The small grants scheme is available each year to support entomology related projects up to $2000.

- Applicants must be members.
- Projects must be undertaken in the 12 months from July of the year of submission to the following June.
- Projects are to be undertaken in Australia.
- Preference is given to stand-alone projects rather than as top ups to existing projects.
- Proposals must be submitted by March 31st.
- Submissions will be reviewed, then successful applicants will be notified in June in order to start their project in July.
- Recipients are required to provide a one page report at the project mid-point; a presentation at a Notes & Exhibits meeting is encouraged but not required.
- A written summary of research findings and project outcomes is also encouraged.
- Submission pro forma is available on the Society website at: www.esq.org.au/pdf/SGSaward2019.pdf

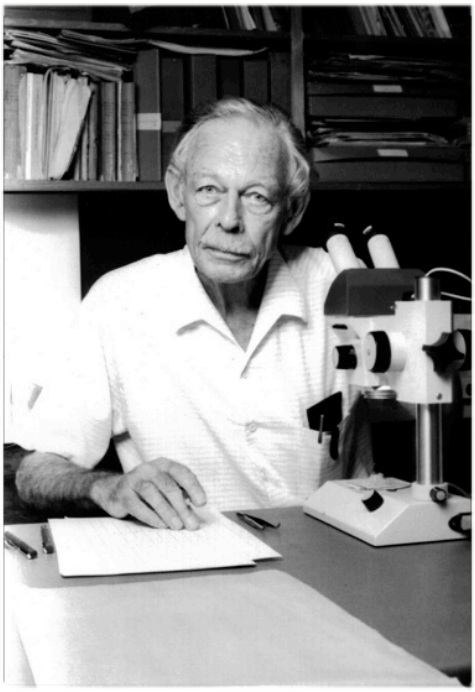
Can you post me some dung beetles?

Hi all. I'm a PhD student at UWA, studying population genetics in Australia's introduced dung beetles. I am looking for volunteers to help me collect dung beetles in Queensland this January. All you need is a bucket, a shovel and access to some cow poo! I provide all of the other necessary materials. Please send me an email if you would be interested in helping out! Thanks!
Email: sarah.leeson@research.uwa.edu.au

--Sarah Leeson

Monarch or Wanderer butterfly, *Danaus plexippus* (Linnaeus, 1758) photographed at the Oxley Creek Common. Photo: Penny Mills

The History Corner...



Thomas Emmanuel WOODWARD (1918–1985)

Tom Woodward was born to a bookish Yorkshire migrant family in Auckland, NZ. Wrote and published poetry, won garden prizes and started collecting insects in his teens. Attended agricultural high school, topped national scholarship competition. Undertook BSc and entomology MSc at University of NZ (now Auckland U.), completed in 1942. Immediately drafted into WW2 New Zealand Army in malaria control. Served two years based in New Caledonia but visited many other islands. Collected Hemiptera everywhere. Then stationed in Egypt and Italy until end WW2 in 1945. Went direct to London under NZ Govt. assistance to do PhD on reproductive behaviour of Hemiptera at Imperial College under Prof. O.W.Richards. Returned to NZ in 1948 and lectured in zoology at Univ. of NZ until 1951 when he was appointed lecturer in new Ento. Dept. at Univ. of Qld, Brisbane, under F.A.Perkins. Had started a series on NZ Hemiptera but changed to Australian fauna and did extensive field work. Published mostly on Lygaeidae *sens. lat.* but also 17 other families. Supervised many postgraduate students and was scrupulous editor of manuscripts and theses. Senior author of Hemiptera chapter in 1970 First edition of *Insects of Australia.* Visiting professor at Univ. of Wisconsin in 1969/70. Retired 1983 and worked as Honorary at QM and DPI until death. Editor for journals of Royal Society of Qld and Entomological Society of Qld. President of ESQ (1955) and Queensland Naturalists' Club.

Obituary: Monteith, G.B. 1986. *News Bulletin of the Entomological Society of Queensland* **13:** 139-140; Monteith, G.B. 1986. *News Bulletin of the Australian Entomological Society* **22**: 55-57.

What is the ESQ Council and what do they do?

Each year the society forms a new governing council which consists of a President, Vice-President, Past President, Treasurer, Secretary, three Councillors, a News Bulletin Editor and the Business Manager from *The Australian Entomologist*. Each of these people volunteers their time to attend a council meeting once a month prior to the General Meetings. These meetings are amiable and provide a time to discuss upcoming events and society interests. The council members undertake various tasks to keep our society running smoothly.

What do they do?

President: the President chairs the meetings and is responsible for inviting our guest speakers for the general meetings. The President also oversees the council and acts as our general community liaison. The President is initially elected as a Vice President, who then steps into the role of President the following year.

Vice President: the Vice President provides back-up when the President is absent and steps into the Presidential role in the following year. The Vice-President can also assist other councillors with special tasks if needed.

Treasurer: the Treasurer takes care of the incoming and outgoing accounts which are mainly incoming membership fees and various expenditures for bulletin printing, postage, student awards, small grants, etc. The treasurer maintains the membership database.

Secretary: the Secretary takes notes at meetings, makes sure the rooms are booked and ready for our meetings, deals with correspondence and mails out new member packs.

Councillors (3): Councillors attend council meetings and provide support as needed.

News Bulletin Editor: The Bulletin Editor collates the meeting minutes, transcript of presentations and other news into a monthly news bulletin; organises the printing and mail out of the bulletin

Business Manager, Australian Entomologist: the Business manager manages many aspects of the journal including subscriptions, invoices, subscriber database, journal mail out and more.

How can you be a part of the action?

As a new year approaches, these council positions are once again open for nomination. If you are interested in getting a bit more involved in your society, this may be your opportunity! If you would like to know more about what any of these positions involve, contact the secretary at secretary@esq.org.au Many of our current councillors have been volunteering for several years and are hoping to relinquish their role to someone new. Please consider helping out with one of these positions. Nomination forms are due to the secretary by 29 January 2019 and can be found at www.esq.org.au/pdf/Nomination2019.pdf . New council positions commence at the March AGM.

Thank you!

Announcements

Membership Renewal Time:

Membership fees are due on the 1st of January 2019 which is ONLY one month away! Time flies, I know. Pay by direct debit now, before you forget, and this will make our Treasurer very happy.

Membership Fees:
General $30
Joint $36
Student $18

Account Name: ENTOMOLOGICAL SOCIETY OF QUEENSLAND
Branch number (BSB): 06 4141
Account number: 00901185
*** Please use member's name as reference number**

See our website form for other payment options and prices: www.esq.org.au/pdf/Renewal2019.pdf
Let us know if you have any address or email changes! Contact us: secretary@esq.org.au

Sunshine Coast BioBlitz

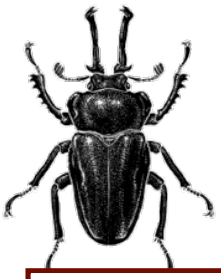
The Sunshine Coast Council is conducting a BioBlitz within the Mary Cairncross Scenic Reserve (MCSR) from 25-31 March 2019. Council is seeking qualified individuals and/or organisations to form a BioBlitz Survey Team to help address knowledge gaps in species diversity within the reserve.

Five individual strangler figs (*Ficus watkinsiana*) have been selected for the study, and with the support of qualified arborists and tree-climbers, the survey scope will include all forms of life found in and on the trees - from the ground, along the vertical profile to the emergent layer. The BioBlitz presents an unprecedented opportunity for scientists to access the canopy and emergent layer within MCSR. The taxonomic groups will include species of native mammals, reptiles, amphibians, birds, plants, lichen, moss, fungi and invertebrates (including arachnids, insects and molluscs).

The BioBlitz will also incorporate an array of public engagement offerings, through which the community will gain an understanding of biodiversity and its significance at MCSR. Members of the Survey Team will be expected to participate in formal and informal events, student mentoring, and sharing their insights with volunteers and artists in residence. Collection at high strata levels in the canopy will be also documented through sound and image, creating a never-before-seen view of rainforest biodiversity.

Are you interested in being a member of the Survey Team? Please contact Liz (email below) for a copy of the supporting document 'Project Overview and EOI Selection Guidelines' carefully. It provides background information on the BioBlitz - including impact minimisation, permit and data recording requirements, and importantly funding and insurance arrangements. Interested applicants must address all criteria and submit their EOI to the BioBlitz Project Officer by 16 December 2018.

Contact for details: Liz Capelin, BioBlitz Project Officer, Liveability and Natural Assets / Centres for Conservation, Learning and Partnerships (CCLP), Sunshine Coast Council
liz.capelin2@sunshinecoast.qld.gov.au



Diary Dates for 2018

Meetings held on the second Tuesday of the respective month

MARCH 13	Tim Heard	AGM and Presidential Address: "*Stingless Bees, their journey from obscurity to insect ambassadors"*
APRIL 10	Andy Walker	*"Exploring the world of insect venoms"*
MAY 8	Brendan Trewin	*"The history of* Aedes aegypti *in Southeast Queensland and novel techniques for its surveillance and control."*
JUNE 13	Notes and Exhibits	Notes & Exhibits
AUGUST 14	Mike Rix	*"Life down under: evolution and conservation of Australia's trap door spiders"*
SEPTEMBER 11	Brian Montgomery	*"Zika Mozzie Seeker - exploring Citizen Science as a tool to monitor invasive and urban mosquitoes"*
OCTOBER 9	Irene Terry	*"Cycad cones, volatile emissions, pollinators and diversification - cells, coevolution & conservation"*
NOVEMBER 13	John Nielsen	*"Mosquitoes, moths and microscopes: life as a biosecurity entomologist in Australia"*
DECEMBER 11	Notes & Exhibits	Notes and Exhibits/Christmas Afternoon Tea

SOCIETY SUBSCRIPTION RATES

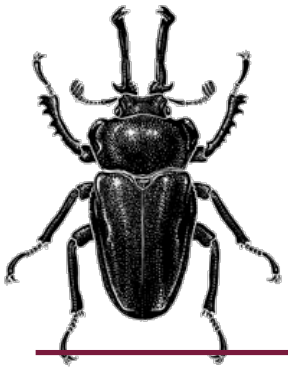
GENERAL	Person who has full membership privileges	**$30pa**
JOINT	Residents in the same household who share a copy of the *News Bulletin*, but each otherwise have full membership privileges.	**$36pa**
STUDENT	Student membership conveys full membership privileges at a reduced rate. **Free the first year**, $18pa subsequent years. Students and others at the discretion of the Society Council.	**$18pa**

ESQ membership subscriptions should be sent to the Treasurer, PO Box 537, Indooroopilly, QLD 4068
http://www.esq.org.au/membership.html

THE *AUSTRALIAN ENTOMOLOGIST* SUBSCRIPTION RATES

AUSTRALIA	Individuals/Institutions	**AU$33pa/AU$37pa**
ASIA/PACIFIC	Individuals/Institutions	**AU$60pa/AU$65pa**
ELSEWHERE	Individuals/Institutions	**AU$65pa/AU$70pa**
ELECTRONIC	Individuals/Institutions	**AU$25pa/AU$30pa**

Journal subscriptions should be sent to the Business Manager, PO Box 537, Indooroopilly QLD 4068
http://www.esq.org.au/publications.html



Entomological Society of Queensland

Notice of next meeting:

Tuesday, 11 December 2018, 3:00 pm

Notes & Exhibits

"Gonipterus *in Queensland: documenting diversity and distribution"*

Natalia Medeiros de Souza, PhD Candidate, University of the Sunshine Coast.

"Physicochemical Properties of Stingless Bee Honey from Queensland and Malaysia."

Nida Zawawi, Queensland Alliance for Agriculture and Food Innovation, University of Queensland.

"Pigeon Louse* Pseudolynchia canariensis *(Hippoboscidae) in Australia"

Christine Lambkin, Queensland Museum

"Some history about the stag beetle,* Phalacrognathus muelleri*, our Society's insect emblem"

Geoff Monteith, Queensland Museum

"Bugs and Beads: the exhibition"

Vivian Sandoval, University of QLD/Queensland Museum

All welcome! Join us after the meeting for tea and coffee and party food! You are welcome to bring a plate to share.

Ground floor Seminar Room, Ecosciences Precinct, Boggo Road, DUTTON PARK

***More venue details available at* http://www.esq.org.au/events.html**

Next News Bulletin: Volume 46, Issue 9 (Jan/Feb 2019)

Deadline Wednesday, 30 January 2019.

Send your news/stories/notices to the editor at: k.ebert@uq.edu.au